1. Product and Company identification

**Product name:** Vitaflo® 280

**Chemical name:** Carboxin / Thiram (Actives)

**Use of substance/preparation:** Fungicide

**Supplier:** Chemtura Canada Co./Cie
25 ERB STREET
Elmira, Ontario N3B 3A3 Canada

**Manufacturer:** Chemtura Corporation
199 Benson Road
Middlebury, CT 06749 USA

**Emergency telephone number:** 866-744-3060 (Canada 24 hours)
CANUTEC (24 hours) 613-996-6666 (call collect)

**Environmental, Health and Safety Department:** 866-430-2775

**Prepared by**
Product Safety Department
Date of Issue: 02/03/2009

(US) +1 866-430-2775
(EU) +44 (0) 1753.603.000
Email: MSDSRequest@chemtura.com

2. HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW**

**CAUTION!**
MAY CAUSE EYE AND SKIN IRRITATION.
EXPOSURE CAN RESULT IN AN ADVERSE REACTION WITH THE CONSUMPTION OF ALCOHOLIC BEVERAGES.
CONSUMPTION OF ALCOHOL SHOULD BE AVOIDED BEFORE AND AFTER EXPOSURE.

3. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>% BY WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carboxin</td>
<td>15.59</td>
</tr>
<tr>
<td>Tetramethylthiuram disulfide</td>
<td>13.25</td>
</tr>
<tr>
<td>Ethylene glycol</td>
<td>10 - 30</td>
</tr>
</tbody>
</table>

(M)(SDS# 000000027026
Ingredients not precisely identified are non-hazardous and/or proprietary.

**WHMIS CLASSIFICATION**

This product is registered under the Pest Control Products Act and is therefore exempt from WHMIS supplier labeling and MSDS requirements. Please read entire MSDS and product label for safety precautions.

**CPR Compliance**

This product has been classified with the hazard criteria of the CPR, and the MSDS contains all the information required by CPR.

### 4. FIRST AID MEASURES

**Swallowing**

If patient is fully conscious, give two glasses of water. Do not induce vomiting unless told to do so by the poison control center or doctor. Obtain medical attention immediately. Do not give milk, oily products, fat or alcohol. Do not give anything by mouth to an unconscious person.

**Inhalation**

Remove to fresh air. Give artificial respiration if not breathing. Obtain medical attention.

**Skin contact**

Wash skin with soap and water. Remove contaminated clothing. Wash clothing before re-use. Obtain medical attention if irritation persists.

**Eye contact**

Immediately flush eyes with water and continue washing for at least 15 minutes. Obtain medical attention.

**Notes to physician**

**ROUTES OF ENTRY:** Eyes, skin, ingestion, inhalation, mist.

If THIRAM is absorbed into the body it may affect the liver, kidneys, and central nervous system. Symptoms may include headache, insomnia, and nervous disorders. In severe cases symptoms may include kidney pain, dizziness, loss of memory and tremors. Alcohol intolerance may result on exposure; symptoms include flushing of the face and neck, followed by rapid heart beat, nausea, vomiting, headache and low blood pressure.

The principal toxic effects of ethylene glycol, when swallowed, are kidney damage and metabolic acidosis. Ethanol is antidotal, and its early administration may block the formation of nephrotoxic metabolites of ethylene glycol in the liver. Ethanol should be given intravenously, as a 5% solution in sodium bicarbonate, at a rate of about 10 ml ethanol per hour. A desired therapeutic level of ethanol in the blood is 100 mg/dl. Hemodialysis may be required. 4-Methylpyrazole, a potent inhibitor of alcohol dehydrogenase, has been used therapeutically to decrease the metabolic consequences of ethylene glycol poisoning before coma, seizure, and renal failure have occurred (20 mg/kg/day). Pulmonary edema with hypoxemia has been described in a number of patients following poisoning with ethylene glycol. The mechanism of production has not been elucidated, but it appears to be noncardiogenic in origin in several cases. Respiratory support with mechanical ventilation and positive end-expiratory pressure may be required. There may be cranial nerve involvement in the late stages of toxicity from swallowed ethylene glycol. In particular, effects have been reported involving the seventh, eighth and ninth cranial nerves, presenting with bilateral facial paralysis, diminished hearing, and dysphagia.

### 5. FIRE-FIGHTING MEASURES

**Hazardous combustion products**

Irritating fumes.

Oxides of carbon.

Oxides of sulfur.

**Special fire fighting procedures**

Do not discharge extinguishing waters into streams, rivers and lakes.

**Special protective equipment for firefighters**

Body covering protective clothing, full "turn-out" gear.

Self-contained breathing apparatus.

**Extinguishing media**

Suitable:

- Large fires:  
  - alcohol-type foam or universal-type foams
- Small fires:  
  - CO2  
  - dry chemical  
  - water spray
6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear suitable protective equipment., Avoid contact with eyes and skin.

Environmental precautions
Prevent from entering sewer system, surface water or soil.

Methods for cleaning up
Observe government regulations.

Small spills: Absorb on inert material such as sand, earth, vermiculite.
Collect for disposal.

Large spills: Dike to contain spill.
Pump excess material into suitable container (metal drums, metal tank, or such).

7. HANDLING AND STORAGE

HANDLING
Handling precautions
Do not eat, drink or smoke when handling., Avoid contact with eyes, skin and clothing., Avoid breathing vapor, aerosol and mist., Use with adequate ventilation., Wash thoroughly after handling.

Other precautions
Do not store near food, feed or fertilizers., Do not contaminate ponds, lakes, streams, or any source of water.

STORAGE
Storage requirements
Store in a cool, dry place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES
Consult local authorities for acceptable provincial values.

<table>
<thead>
<tr>
<th>Component</th>
<th>USA</th>
<th>Country</th>
<th>Type</th>
<th>Value</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetramethylthiuram disulfide</td>
<td></td>
<td>Canada</td>
<td>TLV-TWA</td>
<td>1 ml/m³</td>
<td></td>
</tr>
<tr>
<td>Alberta, Canada</td>
<td></td>
<td></td>
<td></td>
<td>1 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Quebec, Canada</td>
<td></td>
<td></td>
<td></td>
<td>5 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Ethylene glycol</td>
<td>USA</td>
<td>Ceiling, ACGIH</td>
<td>100 mg/m³</td>
<td>(aerosol)</td>
<td></td>
</tr>
</tbody>
</table>

PERSONAL PROTECTION

Respiratory protection
In the absence of engineering controls sufficient to maintain airborne concentrations below recommended occupational exposure limit values, appropriate respiratory protection should be utilized., The determination of appropriate respiratory protection is best performed, on a case by case basis, taking into consideration the exposure conditions of the particular operation. The respirator manufacturer should be consulted to ensure that the air-purifying cartridges utilized
will provide adequate protection for the exposure conditions and period of wear concerned. For emergency conditions where the exposure limit may be greatly exceeded, use an approved positive-pressure self-contained breathing apparatus.

**Hand protection / protective gloves**
Chemical resistant protective gloves

**Eye protection**
Face shield or chemical splash goggles in case of splashing.

**Skin protection**
Chemical protective clothing.

**Other protective equipment**
Eye bath, Safety shower

**Industrial hygiene measures**
Before eating, drinking or smoking, wash hands and face thoroughly with soap and water.

**ENGINEERING CONTROLS**

**Ventilation**
General (mechanical) room ventilation is expected to be satisfactory. Special, local ventilation is needed at points where vapors can be expected to escape to the workplace air.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance**
- **Physical state**: Liquid
- **Color**: Pink
- **Odor**: Mild sweet
- **Odor threshold**: Not available

**Other properties**
- **Melting point**: Freezing point
  -20 °C
- **pH**: ~ 7.8
- **Specific gravity (H2O=1)**: ~1.117
- **Vapor pressure**: Not available
- **Solubility in water**: Not available
- **Partitioning coefficient**: Not available
- **Flash point**: Not available
- **Autoignition temperature**: Not available
- **Upper explosion limits**: Not available
- **Lower explosion limits**: Not available
- **Kinematic viscosity**: No data available.

### 10. STABILITY AND REACTIVITY

**Stability**: This product is stable under normal storage and handling conditions.
Incompatible materials:
Oxidizing agents.
Strong acids.
Strong bases.

Hazardous reactions: Contact with strong acid can produce the following:
Carbon disulfide
Hydrogen disulfide

Hazardous combustion products:
Irritating fumes.
Oxides of carbon.
Oxides of sulfur.

Hazardous polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

GENERAL
The following information is based on analogy with a similar material.

SWALLOWING
Test results
Acute toxicity: LD50 Rat
Result: 4,587 mg/kg
Remark: Test results are based on analogy with a similar material.

SKIN ABSORPTION
Test results
Acute toxicity: LD50 - Rat
Result: > 2,000 mg/kg
Remark: Test results are based on analogy with a similar material.

INHALATION
Test results
Acute toxicity: LC50 - Rat
Result: > 1.0 mg/l
Exposure time: 4 h
Remark: Not available

SKIN CONTACT
Test results
Skin irritation: Species: Rabbit
Result: Moderate irritation
Remark: Test results are based on analogy with a similar material.

EYE CONTACT
Test results
Eye irritation: Species: Rabbit
Result: Moderate irritation
Remark: Test results are based on analogy with a similar material.

SENSITIZATION
Test results:
Species: - Guinea pigs
Classification: not sensitizing
Method: Bühler-Test
Remark: Test results are based on analogy with a similar material.
12. ECOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Component ecotoxicology</th>
<th>LC50 - Rainbow trout (Oncorhynchus mykiss)</th>
<th>Result: 2.3 mg/l</th>
<th>Exposure time: 96 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carboxin</td>
<td>Acute toxicity fish:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component ecotoxicology</th>
<th>LC50 - Bluegill (Lepomis macrochirus)</th>
<th>Result: 3.6 mg/l</th>
<th>Exposure time: 96 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carboxin</td>
<td>Acute toxicity fish:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component ecotoxicology</th>
<th>LC50 - Rainbow trout (Oncorhynchus mykiss)</th>
<th>Result: 0.128 mg/l</th>
<th>Exposure time: 96 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetramethylthiuram disulfide</td>
<td>Acute toxicity fish:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component ecotoxicology</th>
<th>LC50 - Bluegill (Lepomis macrochirus)</th>
<th>Result: 0.0445 mg/l</th>
<th>Exposure time: 96 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetramethylthiuram disulfide</td>
<td>Acute toxicity fish:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component ecotoxicology</th>
<th>EC50 - Rainbow trout (Oncorhynchus mykiss)</th>
<th>Result: 41,000 mg/l</th>
<th>Exposure time: 4 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene glycol</td>
<td>Chronic toxicity fish:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component ecotoxicology</th>
<th>Static LC50 - Rainbow trout (Oncorhynchus mykiss)</th>
<th>Result: 40,761 mg/l</th>
<th>Exposure time: 4 d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene glycol</td>
<td>Chronic toxicity fish:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component ecotoxicology</th>
<th>EC50 - Selenastrum capricornutum</th>
<th>Result: 0.48 mg/l</th>
<th>Exposure time: 120 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carboxin</td>
<td>Aquatic toxicity to plants:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component ecotoxicology</th>
<th>EC50 - Selenastrum capricornutum</th>
<th>Result: 1,300 - 6,500 mg/l</th>
<th>Exposure time: 96 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene glycol</td>
<td>Microorganisms:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component ecotoxicology</th>
<th>EC50 - Photobacterium phosphoreum:</th>
<th>Result: 620 mg/l</th>
<th>Exposure time: 0.5 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene glycol</td>
<td>Microorganisms:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component ecotoxicology</th>
<th>EC50 - Water flea (Daphnia magna)</th>
<th>Result: &gt; 57 mg/l</th>
<th>Exposure time: 48 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carboxin</td>
<td>Acute toxicity to aquatic invertebrates:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component ecotoxicology</th>
<th>LC50 - Water flea (Daphnia magna)</th>
<th>Result: 0.21 ppm</th>
<th>Exposure time: 48 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetramethylthiuram disulfide</td>
<td>Acute toxicity to aquatic invertebrates:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. DISPOSAL CONSIDERATIONS

General: Dispose of waste material in compliance with all federal, provincial and local regulations. Do not discharge to sewers and natural waters.
MATERIAL SAFETY DATA SHEET

Vitaflo® 280

Version: 2.0
Date of Issue: 02/03/2009
Date printed: 10/09/2009

14. TRANSPORT INFORMATION

**TDG - Canada**
Not regulated by ground or rail.

**IMDG Classification**
- **Proper shipping name:** Environmentally hazardous substance, liquid, n.o.s.
- **Class:** 9
- **UN ID #:** UN 3082
- **Packing group:** III
- **Technical description** (Carboxin / Thiram)

**ICAO/IATA Classification**
- **Proper shipping name:** Environmentally hazardous substance, liquid, n.o.s.
- **Class:** 9
- **UN ID #:** UN 3082
- **Packing group:** III
- **Technical description** (Carboxin / Thiram)

Only regulated by air Into, Out of or Within the United States in containers 65 lbs (29.5 kg) or greater.

15. REGULATORY INFORMATION

**WHMIS CLASSIFICATION**
This product is registered under the Pest Control Products Act and is therefore exempt from WHMIS supplier labeling and MSDS requirements. Please read entire MSDS and product label for safety precautions.

**CPR Compliance**
This product has been classified with the hazard criteria of the CPR, and the MSDS contains all the information required by CPR.

**CHEMICAL INVENTORY**

**United States:** This product is subject to regulation under the US Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and is therefore exempt from TSCA Inventory listing requirements.

16. OTHER INFORMATION

<table>
<thead>
<tr>
<th>STP</th>
<th>Standard temperature and pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>W/W</td>
<td>Weight/Weight</td>
</tr>
</tbody>
</table>
THE OPINIONS EXPRESSED HEREIN ARE THOSE OF QUALIFIED EXPERTS WITHIN CHEMTURA CORPORATION. WE BELIEVE THAT THE INFORMATION CONTAINED HEREIN IS CURRENT AS OF THE DATE OF THIS SAFETY DATA SHEET. SINCE THE USE OF THIS INFORMATION AND OF THESE OPINIONS AND THE CONDITIONS OF USE OF THIS PRODUCT ARE NOT WITHIN THE CONTROL OF CHEMTURA CORPORATION, IT IS THE USER'S OBLIGATION TO DETERMINE THE CONDITIONS OF SAFE USE OF THE PRODUCTS.